

## replacement sheet

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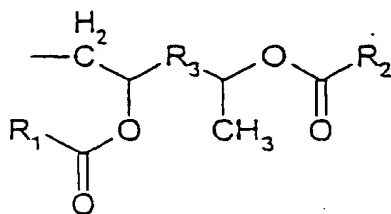
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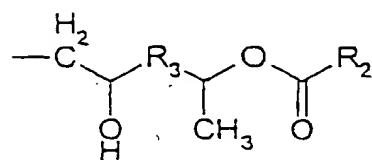
Claims

(52)

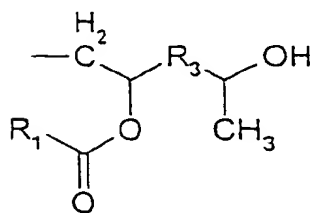
1. Quaternary ammonium compounds of the formula  $R_4[R_5R_6N^+Z]_n X^-$ , wherein Z is covalently bonded to the nitrogen atom and selected from the group of the following formulae (I-IV)



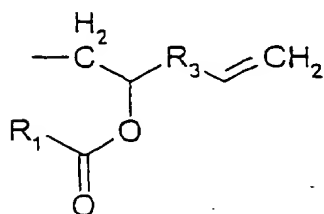
(I),



(II)



(III),



(IV),

and the isomers of any of these compounds, wherein

$R_1$  and  $R_2$  are independently selected from linear or branched, saturated or unsaturated  $C_{6-22}$  hydrocarbyl,

$R_3$  is nothing or  $C_{1-20}$  hydrocarbyl,

$R_4$  is  $C_{1-6}$  alkyl,  $C_{1-6}$  alkylene, or independent Z,

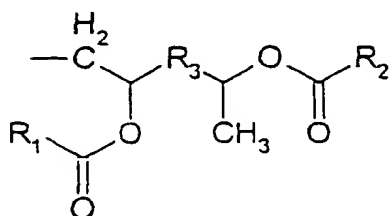
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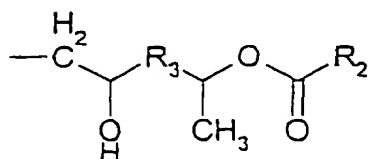
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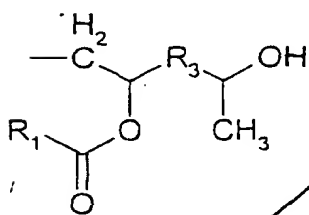
wherein Z is covalently bonded to the nitrogen atom, and of the following formulae (I-IV)



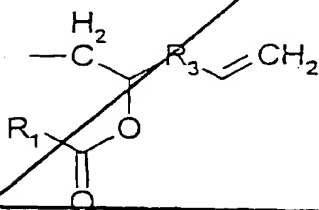
(I).



(II)

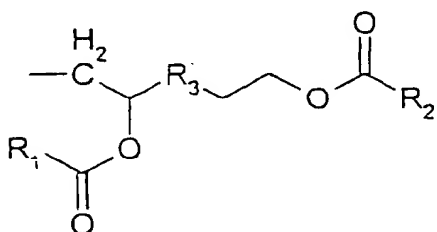


(III)

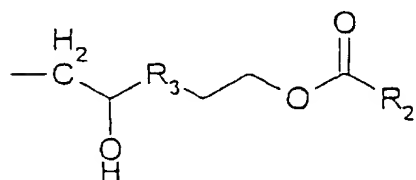


(IV)

isomers thereof with the formulae:



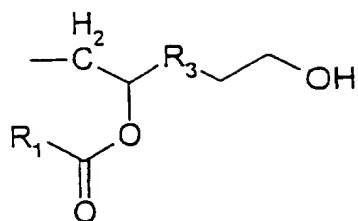
(Ia)



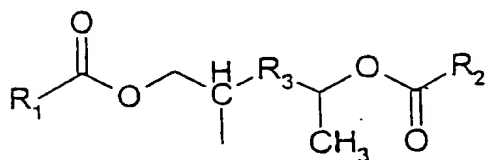
(IIa)

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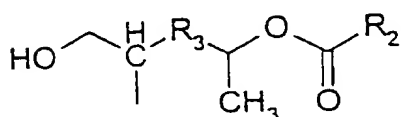
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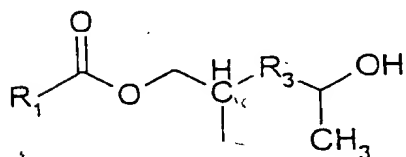
(IIIa)



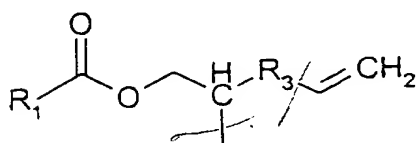
(Ib),



(IIb)

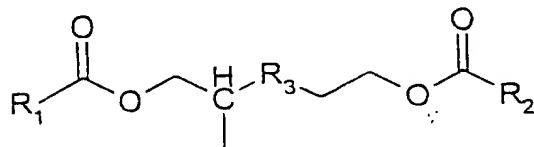


(IIIb)

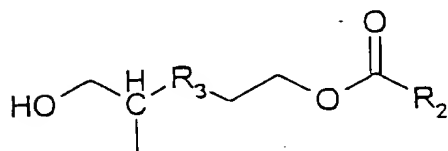


(IVb)

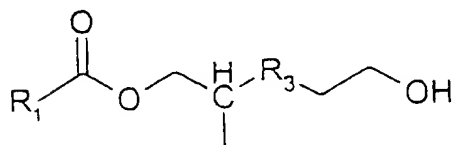
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(Ic)



(IIc), and



(IIIc)

wherein,

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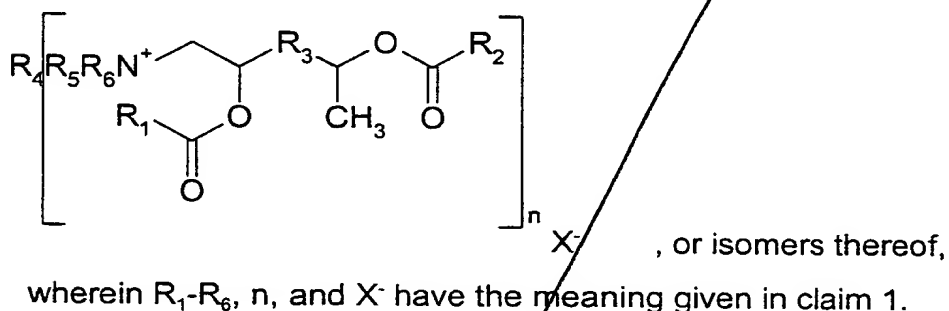
$R_5$  is H,  $C_{1-6}$  alkyl, independent Z, or the residue of the quaternizing agent, such as  $C_{1-30}$  alkyl or alkenyl, preferably,  $C_{1-7}$  alkyl or alkenyl,

$R_6$  is  $C_{1-6}$  alkyl or independent Z,

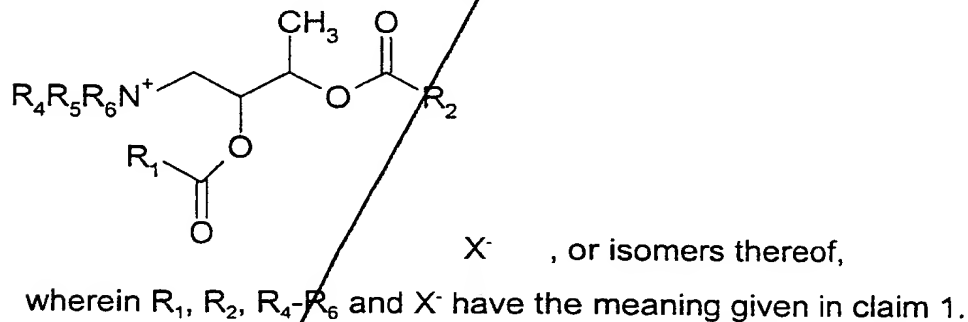
n is 1 or 2, and

- 5  $X^-$  is an ion selected from  $Cl^-$ ,  $Br^-$ ,  $I^-$ ,  $F^-$ ,  $CH_3SO_4^-$ ,  $C_2H_5SO_4^-$ ,  $H_2PO_4^-$ ,  $HPO_4^{2-}$ ,  $PO_4^{3-}$ ,  $H_2PO_3^-$ ,  $HPO_3^{2-}$ ,  $H_2PO_2^-$ ,  $HPO_2^{2-}$ , nitrate<sup>-</sup>, formate<sup>-</sup>, acetate<sup>-</sup>, propionate<sup>-</sup>, tartrate<sup>-</sup> and benzoate<sup>-</sup>, wherein the total charge of the anions equals the total charge of the cations.

- 10 2. Compounds according to claim 1 of the formula



3. Compounds according to claim 2 of the formula



4. Compounds according to any one of claims 1-3 wherein  $R_1$  and  $R_2$  are independently selected from linear or branched, saturated or unsaturated  $C_{12-18}$  alkyl groups.
- 20

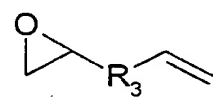
5. Compounds according to any one of the preceding claims, characterized in that  $R_4$  and  $R_6$  are methyl.

5 6. Compounds according to any one of the preceding claims wherein  $X^-$  is chloride, methyl sulfate or ethyl sulfate.

10 7. Intermediates for making one or more of the compounds of the preceding claims according to the formula  $R_4[R_6NZ]_n$ , wherein  $R_4$ ,  $R_6$ ,  $n$ , and  $Z$  have the meaning given in claim 1.

8. Compositions comprising one or more of the compounds according to any one of the preceding claims.

9. A process to make the compounds of claim 1 comprising the steps of:

- 15 - reacting an unsaturated epoxide of the formula  with an amine or protonated amine of the formula  $R_4[R_5R_6N]_n$  or  $R_4[R_5R_6N^+H]_n X^-$ , wherein  $R_3$ ,  $R_4$ ,  $R_5$ ,  $R_6$ ,  $n$ , and  $X^-$  have the meaning given in claim 1, and
- 20 - esterification of the intermediate with, on average, 1-2 moles of fatty acid derivatives, comprising the moieties  $R_1-C(O)-$ ,  $R_2-C(O)-$  or mixtures thereof, per mole of OH groups of the intermediate,
- an optional conventional quaternization either before or after said esterification step.

25 10. A process according to claim 9, characterized in that a trialkylamine is reacted with the unsaturated epoxide.

Sub 11. A process according to claim 9 or 10, characterized in that a product according to any one of claims 2-6 is formed.

12. Use of a compound or composition according to any one of claims 1-8 as a fabric softener.
- 5 13. Use according to claim 12 wherein the compound is used in combination with a conventional performance booster selected from the group consisting of cationic and non-ionic surfactants.

Sub  
a2

ADD  
a3

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